# Clinch River Creel Survey Results: March – October 2001

## TWRA Fisheries Report 02 - 01

**Prepared By**

**Phillip W. Bettoli**
**Tennessee Cooperative Fishery Research Unit**
**Tennessee Technological University**
**Cookeville, TN 38505**

**December 2001**

Development of this report was financed in part by funds from Federal Aid in Fish and Wildlife Restoration (Public Law 91-503) as documented in Federal Aid Project FW- 6 (TWRA Project 7307).

## INTRODUCTION

Fishing pressure and angler demographics at the Clinch River below Norris Dam were previously examined in 1996 and 1997 (Bettoli and Bohm 1997). This report presents the findings of a roving creel survey conducted during the 2001 fishing season. The survey was designed to collect information on the amount of fishing pressure the tailwater received, the catch and harvest rates of rainbow trout and brown trout, and the catch per unit of effort for both species. In 2001, the Clinch River was stocked with 33,300 catchable (230 – 300 mm total length) rainbow trout between April and August; fingerling rainbow trout (n = 160,049) were stocked between March and May 2001. From March through June 20,005 brown trout (~ 180 mm ) were stocked and 57,959 fingerling brown trout were stocked in November.

## METHODS

A stratified uniform-probability roving creel survey was conducted between March and October 2001. The 2001 survey followed the same methods used in the April 1996 – March 1997 survey, with the following exceptions. The 2001 survey only covered eight months and the samples were stratified by month instead of two-week period. Also, the Coldwater Farms access point was replaced by the Culp Property access point, located at the head of Llewellyn Island on the right bank (descending). Approximately eight weekdays and eight weekend days were surveyed each month. Sampling days were divided into equal work periods based on sunrise and sunset times.

The AM and PM work periods were sampled with equal probability. The clerk was equipped with binoculars and counted anglers once each work shift by visiting all of the access sites. The time to start the count was randomly selected from a list of possible start times for each shift, beginning at daylight (or midday) and every 30 minutes thereafter until 1 h before the end of the shift. If more boat trailers than boats on the river were observed, the counts were adjusted upwards by adding two anglers for each boat that was presumed to be on the river, but was not observed.

Before and after the count, the clerk interviewed anglers. They were asked how long they had been fishing that day, whether they were finished fishing, and how many trout they had caught. All creeled trout greater than 30 cm (12 inches) total length were measured to the nearest cm. Anglers were asked their state of residency and Tennessee residents were also asked for their county residence. The clerk also recorded the method of fishing used by each angler.

Mean daily counts were expanded to estimate effort in each stratum (i.e., kind-of-day), and then pooled to estimate effort each month following the methods of Pollock et al. (1994). Catch and harvest rates were measured using the mean of ratios method, which is recommended for roving creel surveys (Pollock et al. 1997); interviews of parties that had been fishing for less than 30 minutes were excluded from the analysis. Catch rates for complete and incomplete-trip anglers were statistically similar (Wilcoxon two-sample test; $\underline{P} = 0.15$); therefore, data were pooled. Standard errors of catch, harvest, and effort each month were calculated according to Pollock et al. (1994). A spreadsheet performed all necessary calculations. The pooled variance for total pressure, total harvest, and total catch of each species was calculated using the mean-square-successive-difference-between-periods procedure. The standard error of each estimate was calculated by taking the square root of the variance.

## RESULTS and DISCUSSION

Fishing pressure totaled 87,081 hours during the March-October 2001 survey period (about 2,500 hours per week), which was only slightly less than the fishing pressure over a comparable interval in the 1996-1997 survey (89,388 hours over 34 weeks). The total amount of water discharged through Norris Dam during the 2001 survey ($2.8 \times 10^9 m^3$) was within 10% of the amount discharged during a comparable period in the previous survey ($3.1 \times 10^9 m^3$); thus, it was not surprising that fishing pressure did not vary greatly between the two surveys. Because of its large size (about 250 hectares at baseflow), fishing pressure per unit area on the Clinch River has been intermediate to the pressure

other Tennessee tailwaters receive (Table 1). The clerk interviewed 771 anglers in 381 parties. In both surveys, most (77-80%) of the anglers interviewed were intercepted at the Songbird, Weir Dam, and Miller Island access sites. Mean trip length in this survey (completed trips only) averaged 3.57 hours (n = 281; SE = 0.11); thus, an estimated 24,392 trips were made to the tailwater between March and October 2001.

Table 1. Fishing pressure on Tennessee tailwaters managed for trout fishing.

| River | Year | Pressure (h) per hectare per week | Reference |
|---|---|---|---|
| Elk | 2000 | 5 | Bettoli (2001) |
| Hiwassee | 2000 | 7 | Luisi and Bettoli (2001) |
| Clinch | 2001 | 10 | This study |
| Clinch | 1996 | 10 | Bettoli and Bohm (1997) |
| Watauga | 1998 | 15 | Bettoli (1999) |
| Caney Fork | 1995 | 17 | Bettoli and Xenakis (1996) |
| Caney Fork | 1997 | 21 | Devlin and Bettoli (1999) |
| S.F. Holston | 1997 | 36 | Bettoli et al. (1999) |

Angler catch rates (number of trout of both species caught per hour) on the Clinch River averaged 0.62 trout per hour (n = 381, SE = 0.06), which was significantly lower than the catch rates during a comparable period in the 1996-1997 survey (1.01 fish per hour; $t = 5.34$; $P < 0.001$). On a per-trip basis, most (79%) anglers did not harvest a trout, but most (58%) did report catching at least one trout (Figure 1). Anglers reported catching nearly 38,000 rainbow trout and more than 8,000 brown trout during the survey period. Only 18,149 rainbow trout and 1,160 brown trout were harvested (Table 2). Harvest rates were also low relative to the number of catchable trout stocked in the previous survey.

The clerk observed 393 rainbow trout in the creel and about 17% were longer than 300 mm (12 inches) total length (TL; Figure 2). The largest rainbow trout observed in the creel was 560 mm TL (22 inches). Only 16 brown trout were observed in the creel and most (n = 13) were recently stocked fish less than 300 mm TL.

The anglers who fished the Clinch River during the 2001 survey shared the same characteristics as those who fished it during the 1996-1997 survey. Nearly all (95%) of the anglers interviewed were Tennessee residents in both surveys. Most of the Tennessee residents interviewed in the 2001 survey were from Knox (46%), Anderson, (31%) and Campbell (10%) counties, similar to the residencies observed in the previous survey. Most of the anglers interviewed in the 2001 survey were using some form of bait (71%) as opposed to artificial lures or flies; a nearly identical percentage (73%) of anglers used bait in the previous survey. The percentages of interviewed anglers using flyfishing gear remained unchanged between the two surveys (16 – 17%).

## CONCLUSIONS

Fishing pressure in 2001 was statistically similar to the amount of pressure the river received in 1996-1997. During both surveys, comparable amounts of water ($\pm$ 10%) passed through the system and fishing pressure varied by less than 3%. It is unknown whether fishing pressure varied significantly in the intervening years, particularly 1999 and 2000, which were drought years in the Tennessee River valley. Angler demographics varied even less than fishing pressure between the two surveys. Catch-per-unit-effort and the number of fish harvested per hour and per trip varied significantly between the surveys. No other data are available to explain or corroborate the findings of lower catch rates and harvest rates in 2001.

## ACKNOWLEDGMENTS

This research was supported by a grant from the Tennessee Wildlife Resources Agency. Additional support was provided by the Center for the Management, Protection, and Utilization of Water Resources at Tennessee Technological University, and the U.S. Geological Survey. Thanks are extended to Mr. Dan Culp for granting access to the river through his property.

## REFERENCES


Bettoli, P.W., and S. M. Xenakis. 1996. An investigation of the trout fishery in the Caney Fork River below Center Hill Dam. Fisheries Report No. 96-23, Tennessee Wildlife Resources Agency, Nashville,TN.

Bettoli, P.W., and L.A. Bohm. 1997. Clinch River trout investigations and creel survey. Fisheries Report No. 97-39. Tennessee Wildlife Resources Agency, Nashville, TN.

Bettoli, P.W. 1999. Creel survey and population dynamics of salmonids stocked into the Watauga River below Wilbur Dam. Fisheries Report No. 99-41. Tennessee Wildlife Resources Agency, Nashville, TN.

Bettoli, P.W., S.J. Owens, and M. Nemeth. 1999. Trout habitat, reproduction, survival and growth in the South Fork of the Holston River. Fisheries Report No. 99-3, Tennessee Wildlife Resources Agency, Nashville, TN

Bettoli, P.W. 2001. Elk River Creel Survey Results – unpublished report to the Tennessee Wildlife Resources Agency, Nashville, TN.

Devlin, G.J., and P.W. Bettoli. 1999. Creel survey and population dynamics of salmonids stocked into the Caney Fork River below Center Hill Dam. Final Report No. 99-8. Tennessee Wildlife Resources Agency, Nashville, TN.

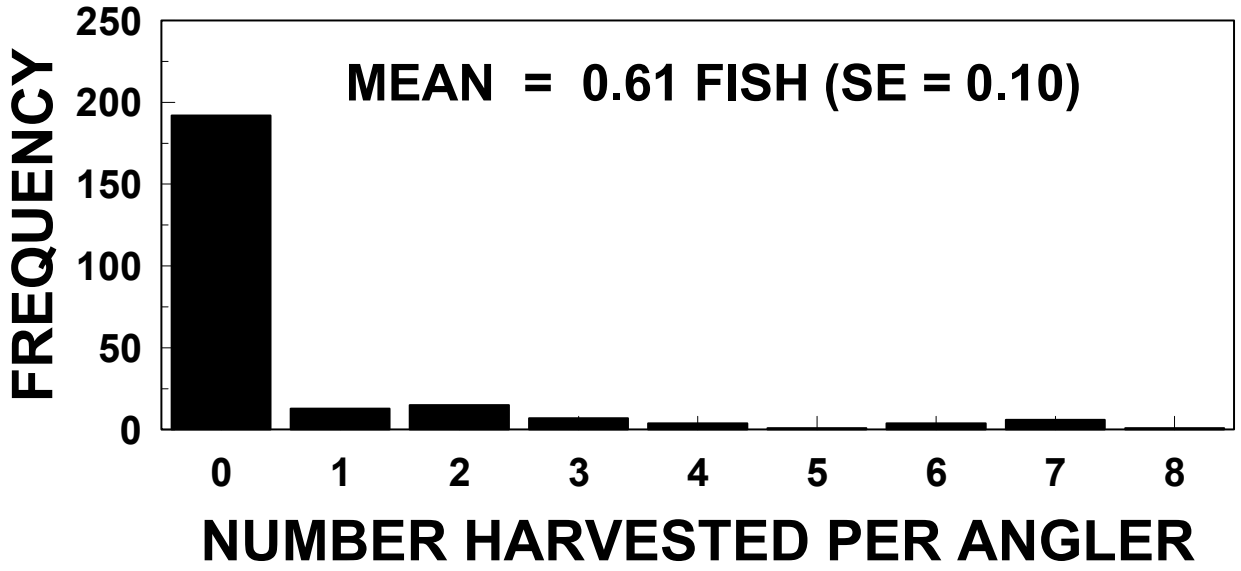
Luisi, M.P., and P.W. Bettoli. 2001. An investigation of the trout fishery in the Hiwassee River. Fisheries Report No. 01-13, Tennessee Wildlife Resources Agency, Nashville, TN.

Pollock, K.H., C.M. Jones, and T.L. Brown. 1994. Angler survey methods and their applications in fisheries management. American Fisheries Society Special Publication 25, Bethesda, MD.

Pollock, K.H., J.M. Hoenig, C.M. Jones, D.S. Robson, and C.J. Greene. 1997. Catch rate estimation for roving and access point surveys. North American Journal of Fisheries Management 17:11-19.

Table 2. Fishing pressure and harvest rates on the Clinch River, 2001. Standard errors are in parentheses.

| Month | Pressure (h) | Number of Rainbow Trout | | Number of Brown Trout | |
|---|---|---|---|---|---|
| | | Caught | Harvested | Caught | Harvested |
| March | 7,676 (1,593) | 3,038 (622) | 677 (215) | 250 (113) | 41 (37) |
| April | 14,484 (1,559) | 6,891 (1,690) | 2,788 (1,126) | 1,254 (664) | 35 (17) |
| May | 11,417 (1,497) | 6,055 (1,769) | 2,874 (1,219) | 3,619 (2,162) | 2 ( - ) |
| June | 13,358 (1,502) | 5,750 (1,539) | 3,185 (1,227) | 1,084 (333) | 272 (175) |
| July | 15,080 (2,221) | 8,742 (3,522) | 4,874 (2,363) | 347 (121) | 282 (211) |
| August | 13,557 (1,602) | 5,911 (2,455) | 3,551 (1,507) | 1,251 (862) | 408 (282) |
| September | 7,611 (840) | 1,139 (403) | 151 (85) | 184 (83) | 99 (61) |
| October | 3,898 (354) | 356 (194) | 49 (27) | 386 (225) | 21 (6) |
| Total | 87,081 hours (8,050) | 37,882 (5,656) | 18,149 (3,424) | 8,375 (2,893) | 1,160 (331) |



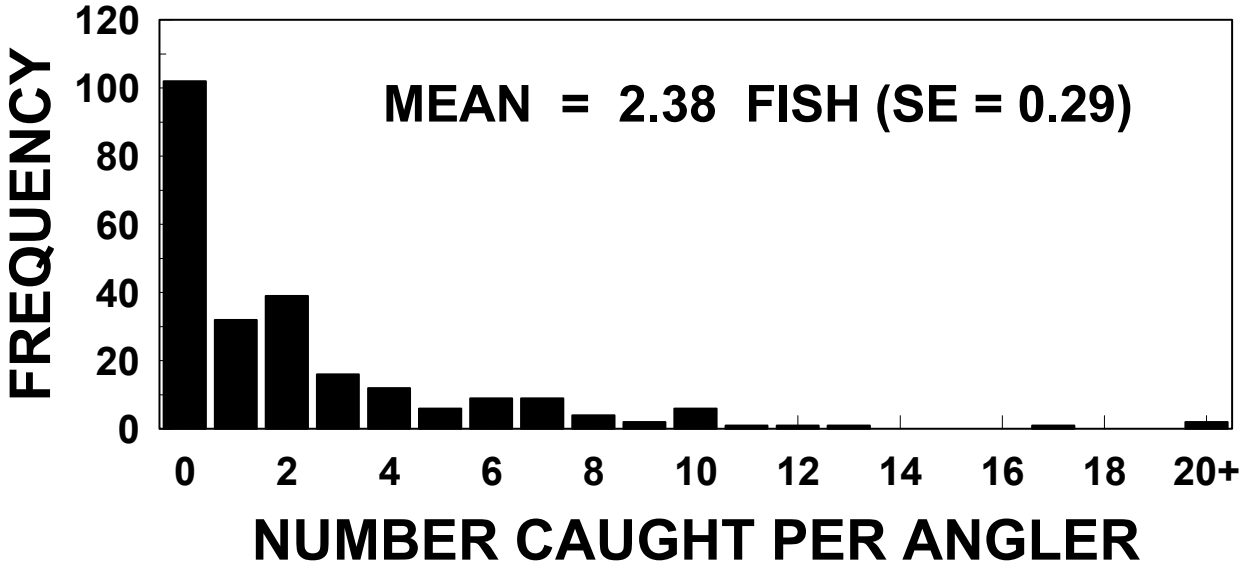




Figure 1. Frequency distribution for the average number of trout harvested and caught by each member of parties that had completed fishing when interviewed on the Clinch River, March 2001 - October 2001. N = 281 parties

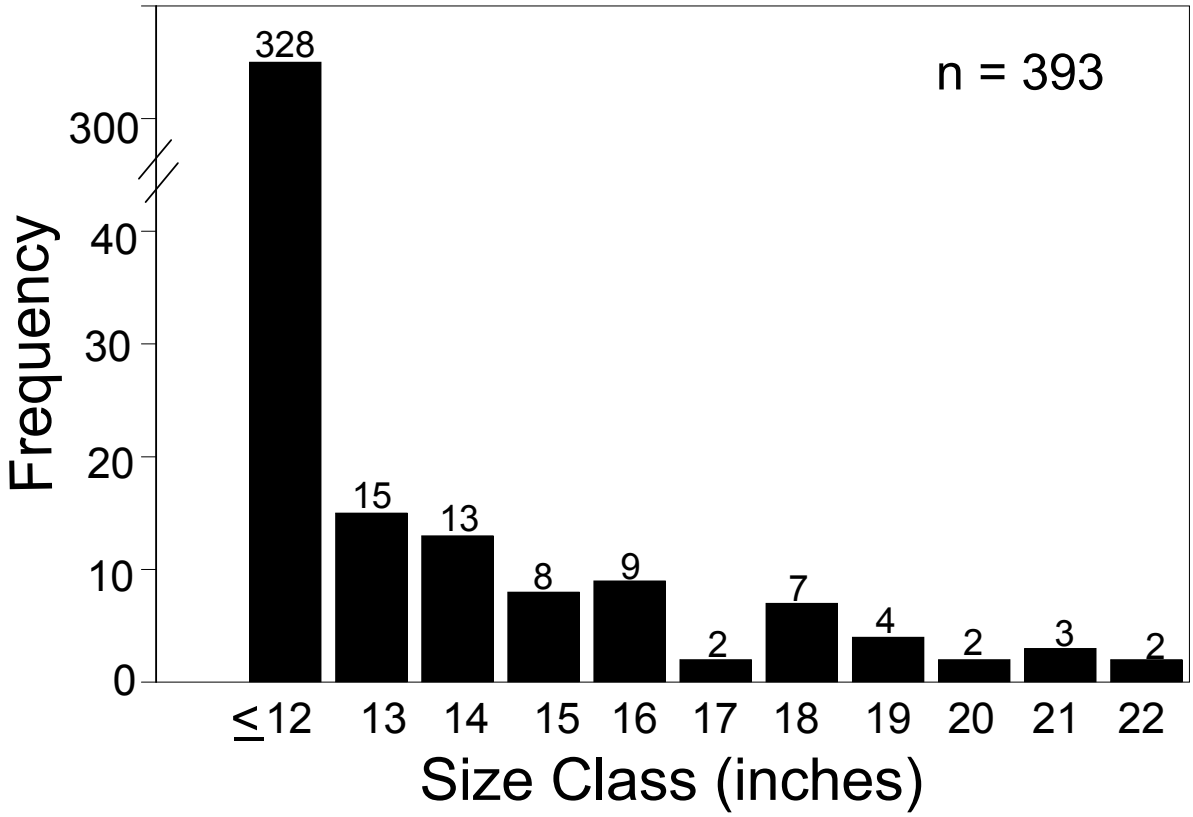



Figure 2. Length-frequency distribution for rainbow trout harvested by anglers on the Clinch River, March - October 2001.

# Appendix

**Data forms used in the 2001 Clinch River Creel Survey**

## DAILY SAMPLE SHEET – CLINCH 2001

DATE (month/day) _____

KIND OF DAY _____
01 = weekday 02= weekend

TIME COUNT BEGAN _____
(military time)

RIVER STAGE WHEN (and WHERE) _____
COUNT BEGAN 01=no generation 02=partial generation 03=full generation

| Access Point | NUMBER OF ANGLERS | NUMBER OF BOATS | NUMBER Of CARS | NUMBER OF TRAILERS |
|---|---|---|---|---|
| 1. SONGBIRD | | | | |
| 2. WEIR DAM | | | | |
| 3. MILLER ISLAND | | | | |
| 4. MASSENGILL BRIDGE | | | | |
| 5. PEACH ORCHARD | | | | |
| 6. HWY 61 RAMP | | | | |
| 7. COUNTY JAIL | | | | |
| 8. CULP PROPERTY | | | | |

**T O T A L S**

| ANGLERS | BOATS | CARS | TRAILERS |
|---|---|---|---|
| | | | |

CLERK _____

**INTERVIEW SHEET - CLINCH RIVER 2001**

DATE (month/day) _____ INTERVIEW NUMBER _____

KIND-OF-DAY _____
Weekday = 1 Weekend / holiday = 2

ACCESS POINT (1 - 8) _____ NUMBER IN PARTY _____

START OF FISHING _____ END OF FISHING _____
(MILITARY TIME) (MILITARY TIME)

Time Fishing HRS_____ COMPLETED TRIP?
By Party YES = 1 NO = 2 _____
MIN_____

SPECIES FISHED FOR: CHECK ONE TROUT _____ OTHER or ANY_____
(1) (2)

Number of RAINBOW TROUT **CAUGHT** = _____ (put "0" if none caught)

Number of RAINBOW TROUT **KEPT** = _____ (put "0" if none)

LENGTHS OF RAINBOWS

Number of BROWN TROUT **CAUGHT** = _____ (put "0" if none caught)

Number of BROWN TROUT **KEPT** = _____ (put "0" if none)

LENGTHS OF TAGGED BROWNS (nearest centimeter)

The numbers entered below should add up to the number in the party

**METHOD**: STILLFISHING _____ SPINFISHING _____ FLYFISHING _____

**BAIT TYPE** : ARTIFICIAL LURES/FLIES _____ BAIT _ _____

**LOCATION:** ON BANK OR WADING _____ IN BOAT _____

STATE_____ AND COUNTY(IF TENN) _____ OF RESIDENCE